

IN THE CLAIMS

Please amend claims 1, 21, 33 and 42 as set forth below:

1. (Currently amended) A network-based surveillance system for real time monitoring of security of an environment, comprising:

a first sensor service unit operatively coupled to a first immersive panoramic sensor for capturing in real time two or more overlapping digital images covering an expanded field of view from a substantially same location to generate first video data representing a first immersive panoramic field of view of the environment;

a management console located remotely from the first sensor service unit and operatively coupled to the network, the network also operatively coupled to the first sensor service unit to ~~allow transmission of~~ transmit the first video data from the first sensor service unit to the management console, the management console including a sensor display subsystem for displaying an immersive panoramic video based at least in part on the first video data transmitted over the network from the first sensor service unit to monitor the security of the environment in real time; and

a data repository located remotely from the first sensor service unit and operatively coupled to the network for storing ~~and~~ or retrieving the first video data marked with time-indices for tracking security events, the time indices representing times at which the overlapping digital images were captured by the first immersive panoramic sensor.

2-20. (Canceled)

21. (Currently amended) A network-based method of real time monitoring of security of an environment, comprising:

generating, at a first sensor service unit, first video data representing a first immersive panoramic field of view of the environment from two or more overlapping digital images covering an expanded field of view from a substantially same location, the two or more overlapping digital images captured in real time by a first immersive panoramic sensor;

at a management console located remotely from the first sensor service unit, displaying a first immersive panoramic video based at least in part on the first video data transmitted over the network from the first sensor service unit to monitor the security of the environment in real time; and

storing or retrieving, at a data repository located remotely from the first sensor service unit, the first video transmitted over the network, the first video data marked with time indices for tracking security events, the time indices representing times at which the overlapping digital images were captured by the first immersive panoramic sensor.

22-32. (Canceled)

33. (Currently amended) ~~A computer program product comprising~~ computer-readable storage medium structured to store instructions executable by a processor in a surveillance system for monitoring security of an environment, the instructions, when executed, cause the processor to:

at a first sensor service unit, generate first video data representing a first immersive panoramic field of view of the environment from two or more overlapping digital images covering an expanded field of view from a substantially same location, the two or more overlapping digital images captured in real time by a first immersive panoramic sensor;

at a management console located remotely from the first sensor service unit, display an immersive panoramic video based at least in part on the first video data

transmitted over the network from the first sensor service unit to monitor the security of the environment in real time; and

at a data repository located remotely from the first sensor service unit, store or retrieve the first video data transmitted over the network, the first video data marked with time indices for tracking security events, the time indices representing times at which the overlapping digital images were captured by the first immersive panoramic sensor.

34. (Canceled)

35. (Previously Presented) The surveillance system of claim 1, wherein the first sensor service unit further comprises a motion detector for generating a sensor specific motion detection event data indicating detection of motion in the two or more overlapping images, the management console operatively coupled to the motion detector for generating a motion detection alarm event based on the sensor specific motion detection event data.

36. (Previously Presented) The surveillance system of claim 35, wherein the first immersive panoramic sensor comprises two or more lenses, each lens capturing a raw video data for one of the overlapping images; the motion detector generates, for each lens, lens specific motion detection event data representing detection of motion in the raw video data captured by that lens, the motion detector filtering out lens specific motion detection event data that are duplicative between different lenses by translating lens coordinates of the motion represented by the lens specific motion detection event data to spherical coordinates to obtain the sensor specific motion detection event data.

37. (Previously Presented) The surveillance system of claim 35, wherein the motion detector generates the sensor specific motion detection event data responsive to detecting motion in a

guard zone of the overlapping images, the guard zone predetermined by a user and representing an area within the field of view of the first immersive panoramic sensor.

38. (Previously Presented) The surveillance system of claim 1, further comprising:

a second sensor service unit operatively coupled to a second immersive panoramic sensor for capturing in real time two or more overlapping digital images to generate second video data representing a second immersive panoramic field of view of the environment, the second sensor service unit operatively coupled to the network to transmit the second video data to the management console.

39. (Previously Presented) The surveillance system of claim 38, wherein each of the first and second sensor service units comprises an image compressor for compressing the first video data and the second video data generated from the overlapping digital images to compressed data for transmission over the network; and the management console comprises an image decompressor for decompressing the compressed data.

40. (Previously Presented) The surveillance system of claim 1, further comprising:

a second sensor service unit operatively coupled to a non-image surveillance sensor system, the non-image surveillance sensor system generating non-image event data based on surveillance of the environment but not based on overlapping digital images, the management console operatively coupled to the second sensor service unit to receive the non-image event data via the network.

41. (Previously Presented) The surveillance system of claim 40 wherein the first sensor service unit, the second sensor service unit and the management console have noncompatible hardware or software configurations; and each of the first sensor service unit, the second sensor service unit and the management console comprise distributed system middleware for providing a

common communication layer that allows the first sensor service unit, the second sensor service unit and the management console to communicate via the network.

42. (Currently amended) The surveillance system of claim 40 wherein the data repository comprises an image store for storing ~~and~~ or retrieving the overlapping digital images received from the first sensor service unit via the network, and a non-image store for storing ~~and~~ or retrieving the non-image event data received from the second sensor service unit via the network.

43. (Previously Presented) The surveillance system of claim 42 wherein the data repository communicates via the network using distributed system middleware.

44. (Previously Presented) The surveillance system of claim 42, wherein the image store comprises a pre-allocated first-in-first-out transient store on a sharable file system, and the non-image store comprises a relational database management system for managing the non-image event data.

45. (Previously Presented) The surveillance system of claim 1, wherein the first sensor service unit transmits a heartbeat message to the management console, the heartbeat message indicating that the first sensor service unit is enabled and actively communicating with the management console via the network.

46. (Previously Presented) The method of claim 21, further comprising:
at the first sensor service unit, generating a sensor specific motion detection event data indicating detection of motion in the two or more overlapping images; and
at the first sensor service unit, generating a motion detection alarm event based on the sensor specific motion detection event data.

47. (Previously Presented) The method of claim 46, wherein generating the sensor specific motion detection event data comprises:

- at each lens of the first immersive panoramic sensor, capturing a raw video data for one of the overlapping images;
- at the first sensor service unit, generating lens specific motion detection event data for each lens, the lens specific motion detection event data representing detection of motion in the raw video data captured by that lens;
- at the first sensor service unit, translating lens coordinates of the motion represented by the lens specific motion detection event data to spherical coordinates; and
- filtering out lens specific motion detection event data that are duplicative between different lenses of the first immersive panoramic sensor to obtain the sensor specific motion detection event data.

48. (Previously Presented) The method of claim 46, further comprising:

- generating the sensor specific motion detection event data responsive to detecting motion in a guard zone of the overlapping images, the guard zone predetermined by a user and representing an area within the field of view of the first immersive panoramic sensor.

49. (Previously Presented) The method of claim 21, further comprising:

- at a second service unit, generating second video data representing a second immersive panoramic field of view of the environment from two or more overlapping digital images captured in real time by a second immersive panoramic sensor;
- at the management console, displaying a second immersive panoramic video based at least in part on the second video data transmitted over the network from the second sensor service unit; and

at the data repository, storing or retrieving the second video data.

50. (Previously Presented) The method of claim 49, further comprising:

at the first and second sensor service units, compressing the overlapping digital images to compressed image data for transmission over the network; and
at the management console, decompressing the compressed image data to display the first or second immersive panoramic video.

51. (Previously Presented) The method of claim 21, further comprising:

at a second service unit, generating non-image event data based on surveillance of the environment but not based on overlapping digital images;
at the management console, receiving the non-image event data via the network; and
at the data repository, storing or retrieving the non-image event data.

52. (Previously Presented) The method of claim 21, further comprising:

at the first sensor service unit, transmitting a heartbeat message to the management console, the heartbeat message indicating that the first sensor service unit is enabled and actively communicating with the management console via the network.